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10/072,031	02/08/2002	Katsuhiko Hirabayashi	6920/OK272	2350
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DARBY & DARBY P.C. 805 Third Avenue New York, NY 10022		EXAMINER SUCHECKI, KRYSZYNA		
		ART UNIT 2882 PAPER NUMBER		

DATE MAILED: 11/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/072,031

Applicant(s)

HIRABAYASHI ET AL.

Examiner

Krystyna Suchecki

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-- The MAILING DATE of this communication appears on the cover sheet with correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 24-30 is/are allowed.
- 6) ☒ Claim(s) 1-2, 5, 7-8, 14-23, 33 is/are rejected.
- 7) ☒ Claim(s) 3-4, 6, 9-13, 31, 32 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## **DETAILED ACTION**

### ***Claim Objections***

1. Claim 2 is objected to because of the following informalities: Claim 2 references “the electrodes on the surface of the substrate”, which has no proper antecedent. For Examination purposes, the electrode arrangement of Figure 1D, wherein connections are made to the portions of the electrodes on the surface of the substrate, will be assumed. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 14-23 and 33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding Claim 14, the limiting meaning of “straight” is unclear, as it removes the inherent internal reflection and refraction of light that would occur within the element. Claim 19 is indefinite because many of the recited elements, for example the PbS detector, would not permit light to be passed “straight through” as is required by claim 14.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 1-2, 5 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Gipson (US 4,732,446).

6. Regarding Claims 1 and 7, Gipson teaches a waveguide-type optical device and method comprising: a substrate (10) on which a plurality of optical waveguides or optical fibers (16) are provided and a full functional equivalent of a linear trench (14) cutting across the plurality of optical waveguides or the optical fibers to divide each of the plurality of optical waveguides or the optical fibers into two portions; a pair of electrodes (52) assigned (see particulars of connected transmission and reception die in Columns 5-6) assigned to optical signal to each optical waveguide or optical fiber and is formed in a direction substantially perpendicular to the longitudinal direction of the trench, from the surface of the substrate at both sides of the trench to wall surfaces of the trench ("J" electrode); and a material or a surface-normal optical device (12) filled or inserted into the trench, and which has one of an electro-optic effect, a thermo-optic effect, a light emitting function, a light receiving function, and a light modulating function (44, 46), wherein light emitted from one of the divided portions of each of the plurality of optical waveguides or the optical fibers goes straight through the material or the surface-normal optical device and is incident on the other of the divided portions. Further, the recitation of formation steps in the device claims are not germane to the issue of patentability of the device. Therefore, the limitations have not been given patentable weight.

7. Regarding Claim 2, Figure 10 of Gipson teaches a waveguide-type optical device as claimed in claim 1, wherein the electrodes on the surface of the substrate are extended by attaching a flexible substrate or by wire bonding (70); and a voltage is applied to the material or device via the extended electrodes.

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8. Regarding Claim 5, Gipson teaches a waveguide-type optical device as claimed in claim 1, wherein the material or device which is filled or inserted into the trench is one of a surface-normal optical modulator, a surface light emitting device, and a surface-normal detector which has one of a lightemitting function, a light receiving function, and a light modulating function (44, 46).

*Claim Rejections - 35 USC § 103*

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gipson in view of Wojnarowski (US 5,562,838).

11. Regarding claim 8, Gipson shows a metal layer (electrode) in a trench of an optical device as stated above. He uses a soldering method or conductive epoxy to create the electrode in the trench.

12. Gipson fails to place electrodes in a trench by sputtering or vapor deposition.

13. Wojnarowski teaches vapor deposition or sputtering of a metal conductive layer (electrode) (226) in a trench (Column 4, lines 31-38 and Column 12). The metal within the trench is taught in conjunction with ablation methods to form a trench with electrical connection to facilitate connections between fibers and electro-optical devices (Column 2, lines 35-38) and in order to improve high density interconnect fabrication by offering an adaptive method for making optical connections to a device on a substrate, especially when the fabrication requires

adaptations during the course of the fabrication to allow for mis-alignments or components that are not in predetermined positions (Column 1, lines 8-13 and Summary).

14. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the vapor deposition or sputtering method of Wojnarowski for the metal (electrode) forming step of Gispon since the both seek electrical interconnections between fibers and electro-optic devices. Further benefits to Gipson would be the use of an improved high density interconnect fabrication with an adaptive method for making optical connections to a device on a substrate, even when the fabrication requires adaptations during the course of the fabrication to allow for mis-alignments or components that are not in predetermined positions (Wojnarowski, Column 1, lines 8-13 and Summary).

*Allowable Subject Matter*

15. Claims 24-30 are allowed.

16. Claims 3-4, 6, 9-13, 31 and 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

17. The following is a statement of reasons for the indication of allowable subject matter: Reasons for allowability of claims 3-4, 6, 9-13, and 24-30 can be found in the Office action dated 07/14/03. Claims 31 and 32 contain allowable subject matter for at least the reason that the prior art fails to teach or suggest a waveguide type optical device, or method for manufacturing same, having, in combination with the other limitations, a trench formed to have a width of 300um or less as claimed.

***Response to Arguments***

18. Applicant's arguments filed 10/14/03 have been fully considered but they are not persuasive. Arguments regarding a "square hole" are not persuasive. Examiner made no assertion that the hole of Gipson was square. Gipson's hole, as can be seen in Figure 2 is longer than it is wide. This creates a rectangular shape which constitutes a linear trench.

19. Arguments regarding Gipson's device having light that does not go "straight through" are not persuasive. As set forth in the 112 rejection above, "receiving" light, as claimed, would not allow the passage of light from one side of the device to the other without some blockage, transfer or refraction of light. Also, since the material and the surface normal optical device are alternatives of each other, the application of Gipson to only one alternative (the surface normal optical device) does not preclude Gipson's application to the claim.

20. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., electrodes not requiring a specific area) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). The electrodes of Gipson are assigned to elements, such as 44 or 46. The elements are assigned to fibers, and, through the association of the elements to the fibers, the electrodes are thereby also assigned to the fibers. The claims are without language to preclude such an assignment of the electrodes to the fibers.

21. Regarding arguments that claim 2 is distinct from the rejection by Gipson made in the prior Office Action, Applicant has changed features of the connection, and a new rejection has been made, thereby making the arguments moot.
22. Regarding arguments for claim 8, Wojnarowski was relied upon to teach a method for applying a metal layer to a substrate, the layer being applied to both the surface of a substrate and also the walls of a trench of the substrate. While the materials of Wojnarowski are reflective, they are also known conductors, and are disclosed as being used to conduct electricity (Column 11, lines 54-58). Selective patterning is also taught by Wojnarowski (Column 12, lines 8-12), but, the feature upon which the applicant relies (i.e., selective application of the metal) is not in claim 8. Consequentially, this argument is not persuasive.

***Conclusion***

23. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).
24. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.



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25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krystyna Suchecki whose telephone number is (703) 305-5424. The examiner can normally be reached on M-F 8-6, with alternating Fridays off.
26. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on (703) 308-4858. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.
27. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4900.

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SUPERVISORY RESEARCH EXAMINER